GEOL 1430-001 (2 credits) and laboratory section GEOL 1430-011 (1 credit) – Global Warming

This course satisfies the University of Arlington core curriculum requirements in Life and Physical Sciences.

Course description:
Future climate change is among the most serious environmental problems facing the world community. This class will survey the scientific basis of global warming and the impacts of climate change on human society. The course will discuss mitigation strategies for creating a more sustainable environment.

Textbooks:

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Assessment of Learning Outcome - Course Policies and Grading:

Grading:
Lecture Portion: 75% of course; Lab Portion: 25% of course

Lab Portion: 15% of course
Signature Assignment: 10% of course
Lecture Portion: 75% of course
Lecture Portion:
  Quizzes (3) 10% of course (3.3% each)
  Exams (3) 45% of course (15% each)
  Final Exam 20% of course

Final grade calculation:
0.25 x lab + 0.10 x quizzes + 0.45 x exams + 0.20 x final exam
Score will be translated into a grade based on class average.

Grades will not be released over the phone or by email. Grades must be either obtained in person or from the UTA online database.

Exams: Exams will be mostly multiple-choice questions, but the final exam will also contain essay questions. No early exams are allowed.

Exams must be taken at the scheduled time. Make-up exams can be only taken in cases of illness or family emergency. A note from the University disciplinary officer or doctor may be required in these cases. Students who do not take an exam receive zero points as a grade on that exam. Make-up exams are scheduled and set by the instructor.

Extra credit assignments: Two extra credit assignments will be given during the class. Extra credit assignments will count towards quizzes. Maximum average grade of quizzes will be no more than 100%.

Homework: Ten homework assignments as part of the lab section will be given throughout the semester. Teamwork is encouraged. Maximum average grade of labs will be no more than 100%.

Quizzes:
Lecture quizzes are not announced. The 3 best quizzes will be counted towards the total grade. There are no make-up quizzes.

Teamwork: Teamwork is encouraged to stimulate scientific discussion in lecture and lab. Teamwork is allowed in the lab assignments and signature project.

Climate Change Research Project (signature project): A signature research assignment in the area of climate change is part of the core curriculum assessment and is designed to stimulate critical thinking skills, teamwork skills, communication skills, and empirical and quantitative skills. A list of research topics related to global warming will be handed out at the beginning of the semester, however, teams can also propose their own topics, which need to be approved by the instructor. Total length of the research paper for each team will be 4-6 pages, letter size, single-spaced, 12 pt Times New Roman font, including references. Each team will give a 10-minute presentation on their project.

Student Learning Outcomes:
This core course covers causes and impacts of climate change, ranging from the historical record to future prediction, and the possible associated socioeconomic impacts and risks. It is one of the courses listed for the interdisciplinary environmental and sustainability studies minor.
After completion of this class, students will have enhanced their critical thinking skills, communication skills, teamwork skills, and empirical and quantitative skills and will have a well-rounded understanding of the major climate science processes.

The students will be able to:

- Describe the Earth’s energy balance, and feedbacks in the climate system.
- Demonstrate how major fossil fuel resources have been formed and are currently used.
- Assess the sources of greenhouse gases and future projection of energy resources, and the ability to forecast future energy production rates.
- Describe the global carbon cycle and the interaction between it various components.
- Analyze the climate record of the past from ice cores, tree rings, and sedimentary deposits.
- Explain the fundamental theories in weather and climate forecast and the application of these theories for future predictions.
- Interpret results from climate projection including expected regional trends in mean climate and climate extremes in temperature and the hydrological cycle.
- Discuss projected socioeconomic impacts related to climate change by droughts, flooding and other severe weather conditions.
- Analyze how health conditions change and diseases may propagate in a changing climate.
- Identify alternative strategies for future energy resources and innovations in transportation and how these strategies could improve environmental sustainability.

This knowledge will enable the students to better understand possible consequences of future climate change, a topic of great societal importance, and will provide them with valuable concepts regarding decision-making for environmental sustainability.

**Critical Thinking Skills:** Critical thinking skills in the area of climate research will be trained through experiments, discussions, and exercises in lecture and labs. The assessment of the critical thinking skills in climate research will be done by a key (signature) assignment that is related to climate change. The goal is to learn and understand critical feedbacks of the climate system and the response of the system to natural and anthropogenic perturbations.

**Communication Skills:** Communications skills will be assessed through scientific discussion in lecture and laboratory. An oral presentation of the signature project will also be used to assess of the communication skills.

**Teamwork:** Teamwork will be promoted in lecture and lab through discussion and review of the lecture material and through empirical and quantitative laboratory exercises. The teamwork skills will be assessed by the signature project.

**Empirical and Quantitative Skills:** Quantitative skills are trained in lecture and labs with on-line interactive models. The assessment of the quantitative skills will be performed through classical problem-solving (e.g. estimation of the Earth’s energy budget) and estimation of future fossil fuel resources, CO₂ emission and associated future climate change.

Students will be guided to design experiments and compare quantitative estimates in the signature project with observations.

**Attendance:**
Attendance is required and may be taken occasionally. Lack of attendance may influence the final grade.
Drop Policy:
Students may drop or swap classes through self-service in MyMav from the beginning of the registration period through the late registration period. After the late registration period, students must see their academic advisor to drop a class or withdraw. It is the student's responsibility to officially withdraw if they do not plan to attend after registering. Students will not be automatically dropped for non-attendance.

Students with Disabilities (Americans With Disabilities Act):
Any student requiring an accommodation for this course must provide the instructor with official documentation in the form of a letter certified by the staff in the Office for Students with Disabilities, University Hall 102. Only those students who have officially documented a need for an accommodation will have their request honored. Information regarding diagnostic criteria and policies for obtaining disability-based academic accommodations can be found at www.uta.edu/disability or by calling the Office for Students with Disabilities at (817) 272-3364.

Academic Integrity:
Academic dishonesty (such as cheating, plagiarism, taking an exam for another person, etc.) will not be tolerated in any form and will be disciplined in accordance with University regulations and procedures. All students enrolled in this course are expected to adhere to the UT Arlington Honor Code:

I pledge, on my honor, to uphold UT Arlington’s tradition of academic integrity, a tradition that values hard work and honest effort in the pursuit of academic excellence. I promise that I will submit only work that I personally create or contribute to group collaborations, and I will appropriately reference any work from other sources. I will follow the highest standards of integrity and uphold the spirit of the Honor Code.

Student Support Services:
UT Arlington provides a variety of resources and programs designed to help students develop academic skills, deal with personal situations, and better understand concepts and information related to their courses. Resources include tutoring, major-based learning centers, developmental education, advising and mentoring, personal counseling, and federally funded programs. For individualized referrals, students may visit the reception desk at University College (Ransom Hall), call the Maverick Resource Hotline at 817-272-6107, send a message to resources@uta.edu, or view the information at www.uta.edu/resources.

Electronic Communication:
UT Arlington has adopted MavMail as its official means to communicate with students about important deadlines and events, as well as to transact university-related business regarding financial aid, tuition, grades, graduation, etc. All students are assigned a MavMail account and are responsible for checking the inbox regularly. There is no additional charge to students for using this account, which remains active even after graduation. Information about activating and using MavMail is available at http://www.uta.edu/oit/cs/email/mavmail.php

Student Feedback Survey:
At the end of each term, students enrolled in classes shall be directed to complete a Student Feedback Survey (SFS). Instructions on how to access the SFS for this course will be sent directly to each student through MavMail approximately 10 days before the end of the term. Each student’s feedback enters the SFS database anonymously and is aggregated with that of other students enrolled in the course. UT Arlington’s effort to solicit, gather, tabulate, and publish
student feedback is required by state law; students are strongly urged to participate. For more information, visit http://www.uta.edu/sfs.

No use of cell phones (or other electronic devices) during exams.

Class Material: https://elearn.uta.edu/webapps/login/

Blackboard Info: http://www.uta.edu/blackboard/students/index.html